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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,534	12/31/2003	Peter A. Davison	884.A71US1	5554
21186 7590 08/21/2007 SCHWEGMAN, LUNDBERG & WOESSNER, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402			EXAMINER EWALD, MARIA VERONICA	
			ART UNIT 1722	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/750,534

Applicant(s)

DAVISON ET AL.

Examiner

Maria Veronica D. Ewald

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 June 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6, 8, 11, 12 and 23-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8, 11, 12 and 23-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 October 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Continued Examination Under 37 CFR 1.114***

13. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 13, 2007 has been entered.

### ***Claim Rejections - 35 USC § 102***

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Okazaki, et al. (U.S. 4,723,903). Okazaki, et al. teach an apparatus comprising: an embossing tool substrate made of a first metal (item 1 – figure 3a and 3b; column 2, lines 65 – 66), a first major surface of the substrate having an embossing profile (figures 3a and 3b); a

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first coating over the first major surface of the substrate, the first coating providing an adherable surface (column 3, lines 1 – 3); and a second coating over the first coating, the second coating providing a non-adhesive outer surface (column 3, lines 5 – 7).

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by DePuydt, et al. (U.S. 6,030,556). DePuydt, et al. teach an apparatus comprising an embossing tool substrate made of a first metal, a first major surface of the substrate having an embossing profile (item 42 – figure 4; column 1, lines 15 – 20; column 7, lines 1 – 5); a first coating over the first major surface of the substrate, the first coating providing an adherable surface (column 7, lines 10 – 15); and a second coating over the first coating, the second coating providing a non-adhesive outer surface (column 7, lines 59 – 65); wherein the first coating is further comprised of three layers (a dielectric layer and a patterning layer comprised of two distinct layers), wherein there is a first layer of a second metal deposited over the embossing tool substrate (column 7, lines 28 – 31, 45 – 50); a subsequent layer over the base layer of second metal (column 5, lines 25 – 35, 58 – 60); and the third layer (column 5, lines 58 – 60). Furthermore, the second coating, also known as the cap coating or cap layer is provided to reduce or prevent disruptions to the planarity of the patterning material layers of the first coating (column 7, lines 60 – 65). DePuydt, et al. further teach that the layers of the individual layers depends on the desired pit depth in the discs to be stamped or formed (column 6, lines 60 – 65).

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Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Homola, et al. (U.S. 2004/0202865 A1). Homola, et al. teach an apparatus comprising: an embossing tool substrate made of a first metal (item 110 – figure 1a; paragraph 0020), a first major surface of the substrate having an embossing profile (figure 1a); a first coating over the first major surface of the substrate, the first coating providing an adherable surface (item 130 – paragraph 0022); and a second coating over the first coating, the second coating providing a non-adhesive outer surface (item 120 – figure 1a; paragraph 0019).

Claim 23 is rejected under 35 U.S.C. 102(b) as being anticipated by Okazaki, et al. (U.S. 4,723,903). Okazaki, et al. teach an apparatus comprising: an embossing tool that includes: a tool substrate base (item 1 – figure 3a and 3b); and means attached to the tool substrate base for providing a hardened embossing surface with reduced adherence properties to an embossable substrate (column 3, lines 5 – 7).

Claim 23 is rejected under 35 U.S.C. 102(e) as being anticipated by Homola, et al. (U.S. 2004/0202865 A1). Homola, et al. teach an apparatus comprising: an embossing tool that includes: a tool substrate base (item 110 – figure 1a); and means attached to the tool substrate base for providing a hardened embossing surface with reduced adherence properties to an embossable substrate (item 120 – figure 1a; paragraph 0019).

Claim 23 is rejected under 35 U.S.C. 102(e) as being anticipated by Wago, et al. (U.S. 6,869,557). Wago, et al. teach an apparatus comprising: an embossing tool that includes: a tool substrate base (item 12 – figure 4); and means attached to the tool substrate base for providing a hardened embossing surface with reduced adherence properties to an embossable substrate (column 2, lines 60 – 65).

Claims 23 – 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Kyminas, et al. (U.S. 4,474,920). Kyminas, et al. teach an apparatus comprising: an embossing tool that includes: a tool substrate base (item 11 – figure 1); and means attached to the tool substrate base for providing a hardened embossing surface with reduced adherence properties to an embossable substrate (column 3, lines 20 – 35); wherein means for providing an embossable surface including a polymer film having attached thereto means for releasing the embossing tool, mixed with an epoxy resin (column 6, lines 40 – 45).

### ***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 – 3 and 5 – 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki, et al. or DePuydt, et al. in view of Ohman, et al. and further in view of Imatomi (U.S. 2006/0051453 A1). Okazaki, et al. and DePuydt, et al. teach the characteristics previously described but do not teach the specific metals in a multi-layered stamper, comprised of a layer of a second metal, a layer of a metal oxide and a layer of a metal nitride, respectively. It is important to note, however, that Okazaki, et al. teach that the stamper can be comprised of multiple layers of metal film over the substrate base, the layers providing for strengthening adhesion or damping the stress encountered by the stamper and thus, prolonging its useful life. In addition, DePuydt, et al., do disclose the substrate with its multi-layered coating, such that the coating layers range in thickness from 10 – 200 nm. It is, therefore, known to one of ordinary skill in the art to apply metal or metal alloys in the formation of a substrate tool in layers and to ensure that such layers are very thin.

Ohman, et al. teach the use of a three-layered substrate, comprised of a base metal layer, a thin layer of a second metal with good electrical characteristics, and a hard, wear-resistant layer, providing good release characteristics when contacted against the plastic element to be embossed (column 19, lines 15 – 25). The outermost wear-resistant layer consists of up to 5 micrometers ( $\mu\text{m}$ ) of titanium nitride. In addition, Ohman, et al. teach that the respective layers should be fairly thin ( $< 20 \mu\text{m}$  or between  $2 - 10 \mu\text{m}$ ) to produce optimum results (column 18, lines 10 – 13). Furthermore, though the Applicant has claimed the specific thicknesses of  $0.5 \mu\text{m}$  and  $2 - 9 \mu\text{m}$ , the Applicant has not introduced specific reasoning for utilizing such thicknesses. On the

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other hand, Ohman, et al. has stated that practically, very thin layers produce optimum results. Therefore, one of ordinary skill in the art would conclude that optimum results and higher quality substrates are produced with thinner layers.

Furthermore, in a method to manufacture a metal mold device, Imatomi teaches that components of the mold may be produced with layers (paragraph 0090), wherein there is a base layer, an inner layer and an outermost layer. The inner and outermost layers may be made of zirconium oxide and/or zirconium nitride among other metal compounds that may be used. The use of zirconium nitride and oxide provides good wear-resistant characteristics and toughness (paragraph 0091).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the layered substrate of Okazaki, et al. or DePuydt, et al. with the zirconium oxide and zirconium nitride layers of Imatomi, et al., and ensuring that the layers are very thin, as taught Ohman, et al. for the purposes of providing layers, with toughness and good wear-resistance as taught by Imatomi and producing optimum results as taught by Ohman, et al.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki, et al. or DePuydt, et al. in view of Cheung, et al. (U.S. 6,210,514). Okazaki, et al. and DePuydt, et al. teach the characteristics previously described but do not teach that the second coating is comprised of polyparaxylylene.

In a method to fabricate thin film structures onto a substrate, Cheung, et al. teach the use of dielectric deposition of parylene C (paraxylylene), of 5  $\mu\text{m}$  thick, onto the



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substrate (column 11, lines 35 – 37). The dielectric deposition of such a coating enhances moisture and chemical barrier properties of the finished assembly (column 11, lines 43 – 45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to use paraxylylene as the cap layer or second coating in the multi-layered stamper of either Okazaki, et al. or DePuydt, et al. for the purpose of maintaining the integrity and chemical properties of the patterning layer in the first coating.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki, et al. or DePuydt, et al. in view of Ohman, et al., further in view of Imatomi (U.S. 2006/0051453 A1) and further in view of Cheung, et al. Okazaki, et al., DePuydt, et al., Ohman, et al. and Imatomi teach the characteristics previously described but do not teach that the second coating is comprised of polyparaxylylene.

In a method to fabricate thin film structures onto a substrate, Cheung, et al. teach the use of dielectric deposition of parylene C (paraxylylene), of 5  $\mu\text{m}$  thick, onto the substrate (column 11, lines 35 – 37). The dielectric deposition of such a coating enhances moisture and chemical barrier properties of the finished assembly (column 11, lines 43 – 45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to use paraxylylene as the cap layer or second coating in the multi-layered stamper of either Okazaki, et al. or DePuydt, et al. further configured

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with the multi-layered composition of Ohman, et al. and Imatomi, for the purpose of maintaining the integrity and chemical properties of the patterning layer in the first coating.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki, et al., DePuydt, et al. or Homola, et al. in view of Wago, et al. (U.S. 6,869,557). Okazaki, et al., DePuydt, et al. and Homola, et al. do not explicitly teach that the apparatus for embossing is further comprised of a heater and a pressure apparatus; however, it is obvious that both of these elements are present in such typical embossing or stamping apparatus.

For example, in a method to emboss or stamp a disk during thermal imprint lithography, Wago, et al. teach the use of both a heating apparatus to heat the embossable substrate and stamper (figure 2) and a pressure apparatus to apply the necessary pressure (10 MPa shown) to adequately transfer the negative pattern from the stamper surface to the embossable substrate, producing the opposite, positive pattern on the substrate surface (figure 2).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to include with the embossing tool of Okazaki, et al., DePuydt, et al. or Homola, et al. both a heating apparatus and pressure apparatus to adequately perform thermal imprint lithography, wherein the heat is used to heat the stamper and disk or embossable substrate (allowing the deformation of the substrate surface) and

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wherein the pressure is used to adequately transfer the negative pattern on the stamper surface to the substrate surface, resulting in a positive or opposite pattern.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki, et al. in view of Imatomi. Okazaki, et al. teach the characteristics previously described, but do not specifically teach that the substrate is coated with a layer of zirconium and a layer of zirconium nitride over the layer of zirconium. It is important to note, however, that Okazaki, et al. teach that the stamper can be comprised of multiple layers of metal film over the substrate base, the layers providing for strengthening adhesion or damping the stress encountered by the stamper and thus, prolonging its useful life.

In a method to manufacture a metal mold device, Imatomi teaches that components of the mold may be produced with layers (paragraph 0090), wherein there is a base layer, an inner layer and an outermost layer. The inner and outermost layers may be made of zirconium oxide and/or zirconium nitride among other metal compounds that may be used. The use of zirconium nitride and oxide provides good wear-resistant characteristics and toughness (paragraph 0091).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the layered substrate of Okazaki, et al. with the zirconium oxide and zirconium nitride layers of Imatomi, for the purposes of providing layers with toughness and good wear-resistance as taught by Imatomi.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki, et al. or Wago, et al. in view of Imatomi. Okazaki, et al. and Wago, et al. teach the characteristics previously described but do not teach that the coatings are comprised of zirconium and zirconium nitride, respectively. It is important to note, however, that Okazaki, et al. teach that the stamper can be comprised of multiple layers of metal film over the substrate base, the layers providing for strengthening adhesion or damping the stress encountered by the stamper and thus, prolonging its useful life.

In a method to manufacture a metal mold device, Imatomi teaches that components of the mold may be produced with layers (paragraph 0090), wherein there is a base layer, an inner layer and an outermost layer. The inner and outermost layers may be made of zirconium oxide and/or zirconium nitride among other metal compounds that may be used. The use of zirconium nitride and oxide provides good wear-resistant characteristics and toughness (paragraph 0091).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the layered substrate of either Okazaki, et al. or Wago, et al. with the zirconium oxide and zirconium nitride layers of Imatomi, for the purposes of providing layers with toughness and good wear-resistance as taught by Imatomi.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki, et al. or Wago, et al. in view of Imatomi and further in view of Cheung, et al. Okazaki, et

al., Wago, et al. and Imatomi teach the characteristics previously described but do not teach that there is a further coating comprised of polyparaxylylene.

In a method to fabricate thin film structures onto a substrate, Cheung, et al. teach the use of dielectric deposition of parylene C (paraxylylene), of 5  $\mu\text{m}$  thick, onto the substrate (column 11, lines 35 – 37). The dielectric deposition of such a coating enhances moisture and chemical barrier properties of the finished assembly (column 11, lines 43 – 45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the multi-layered coated substrate of either Okazaki, et al. or Wago, et al. with the zirconium oxide and nitride layers of Imatomi to further include an outer layer of paraxylylene as for the purpose of maintaining the integrity and chemical properties of the patterning layer in the first coating.

### ***Response to Arguments***

16. Applicant's arguments filed March 2, 2007 have been fully considered but they are not persuasive, with respect to the rejection of the claims as anticipated by DePuydt, et al. *With respect to the rejection of independent claim 1 over the reference of DePuydt, et al. (U.S. 6,030,556)*, Applicant has argued that DePuydt, et al. do not teach adherable and non-adherable properties of the dielectric and cap layers; however, Examiner disagrees. DePuydt, et al. teach a substrate, which can be made of metal (column 7, lines 1 – 10), on which a dielectric layer is placed (item 44 – figure 4), of which the dielectric layer also serves to promote adhesion between the substrate and

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the patterning material (column 7, lines 40 – 45) and thus, the dielectric or first coating provides an *adherable surface*. The second coating over the first coating is the patterning material, which is comprised of the topmost layer or cap layer (column 7, lines 59 – 65). Even though DePuydt, et al. has stated that the dielectric layer and the cap layer *can be made of materials that are the same or materials derived from the same list, it does not imply that the material chosen for the layers have to be identical to each other*. Furthermore, because the reference is teaching the fabrication of a stamper, it is inherent that the cap layer of the stamper has characteristics that do not allow it to adhere to the disc being stamped. Examiner is also noting that the examples shown in columns 12 – 14 all teach multi-layered stampers wherein the layers are not each identical to each other.

With respect to Applicant's arguments regarding the rejection(s) as anticipated by the reference of Ohman, et al., Examiner agrees that the substrate of Ohman, et al. is not comprised of metal, and thus, the rejection has been withdrawn.

With respect to independent claims 1 and 23, Examiner has also rejected such claims in view of the references of Okazaki, et al., Homola, et al. and Wago, et al., respectively. Each reference teaches a stamper, comprised of a base metal or layer, over which is disposed, a coating or coatings. Okazaki, et al. teach that the metal layers disposed over the substrate base promote adhesion strength and/or dampens stress. Homola, et al. teach the use of an oxide layer disposed between the substrate base and the release coating to promote adhesion strength as well. With respect to claim 23,

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Wago, et al. teach a substrate base over which a coating is disposed to facilitate release from the disk or surface being embossed.

*Examiner is also noting that though Applicant has stated that "claims 23 – 26 have been deleted as Applicant does not wish to pursue these claims at this time" (page 6 of arguments), these claims remain in the listing of claims. It is unclear whether Applicant is canceling such claims or simply not addressing the rejection. If Applicant wishes to cancel such claims, it is necessary to clearly indicate this in the listing of claims. Thus, because the status identifiers on the claims listing still label these claims as "Original" Examiner maintains the rejection with respect to the reference of Kyminas, et al. (U.S. 4,474,920) and further applies the references of Okazaki, et al., Homola, et al. and Wago, et al.*

### **Conclusion**

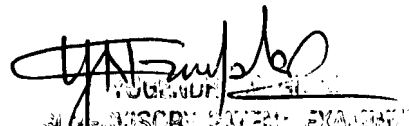
17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Veronica D. Ewald whose telephone number is 571-272-8519. The examiner can normally be reached on M-F, 8 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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MVE

  
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